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| 10/766,986 | 12/24/2003 | Akihiro Mochizuki | 350292001900 | 3442 |
| <div>7590 Barry E. Bretschneider Morrison & Foerster LLP Suite 300 1650 Tysons Boulevard McLean, VA 22102</div> | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/766,986

Applicant(s)

MOCHIZUKI ET AL.

Examiner

ANDREW SCHECHTER

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 and 31-33 is/are pending in the application.
- 4a) Of the above claim(s) 8-29 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on 24 March 2008 and 18 April 2008 have been entered.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Response to Arguments

3. Applicant's arguments filed 24 March 2008 have been fully considered but they are not persuasive.

The applicant presents in the declaration of 18 April 2008 descriptions of experiments on devices fashioned as described by *Tanaka*, *Takatori*, and the present application. The applicant argues based on these experiments that *Tanaka* and *Takatori* do not disclose devices which are within the scope of the present claims. The

examiner has carefully considered the declaration, but is not yet persuaded by this argument due to the following issues raised by the declaration.

First, the discussion therein raises questions relating to the scope of the claim as discussed below under 35 USC 112.

Second, the declaration asserts that the devices fashioned according to the disclosure of *Tanaka* and *Takatori* display a spontaneous polarization, and are therefore outside the scope of the claims. This flatly contradicts the explicit statements of *Tanaka* and *Takatori* that there is no spontaneous polarization, as cited in the rejections under 35 USC 102. What is the explanation for this contradiction? Are they simply in error? Does the term "spontaneous polarization" carry different meanings between those references and the present application? Is the difference one of degree, that with (for instance) improvements in fabrication and measurement techniques, the standard implied by the phrase "no spontaneous polarization" has changed? Is the detection method used by the applicant merely more sensitive than that of the previous inventors?

Third, in both *Tanaka* and *Takatori* the lack of spontaneous polarization appears to be a desired property, a goal. Does the present application merely achieve a quantitatively smaller spontaneous polarization than was previously obtained, or is there a qualitative difference between the present application and the prior art? Does claim 1 merely amount to claiming the goal of an un-measurably small spontaneous polarization?

Fourth, the declaration [see pp. 10-12, for instance] discloses many details regarding how the present device was constructed, differing in many respects from the

techniques used to fashion the devices as described by *Tanaka* and *Takatori* [pp. 3-4 and 7], including (for instance) using different liquid crystal materials with different inherent spontaneous polarizations. Which of these differences is responsible for the observed difference in the peak-shaped current? Is there a fundamental difference, or might a more careful fabrication technique have resulted in less or no spontaneous polarization for the *Tanaka*- and *Takatori*-style devices? Patentability of device claims typically rests on distinguishing them structurally from the prior art [see MPEP 2114, for instance]. What are the structural differences between the present device and those of *Tanaka* and *Takatori*?

The declaration is clearly a substantial effort to establish an unobvious difference to distinguish the claimed invention from prior art which appears to be substantially identical [in that the references state that there is a lack of spontaneous polarization], in the spirit of MPEP 2113 and MPEP 716.02. However, as can be seen from the issues raised above, the examiner is not yet satisfied that the claimed invention has been clearly defined and that it differs in a patentable way from the prior art devices. Pending further discussion of these issues, the examiner maintains the previous rejections. Also, new rejections are made under 35 USC 112, and new rejections are made based on a non-ferroelectric LCD.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-7, 32, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites that the liquid crystal material "shows almost no spontaneous polarization ... under the absence of an externally applied voltage". The applicant, however, in effect defines this in terms of the liquid crystal's response to a triangular voltage form [compare the specification and the declaration of 18 April 2008, and note dependent claim 33], which is of course an externally applied voltage. The examiner is not sure how to resolve the contradiction which this presents.

For instance, *Tanaka* states explicitly that with no voltage applied, the liquid crystal is in an anti-ferroelectric state in which there is no spontaneous polarization [col. 12, lines 36-67]. However, they also disclose [col. 13, lines 5-12], as discussed in the applicant's declaration of 18 April 2008 [p. 5], that under the application of sufficiently large voltage, the liquid crystal can shift into one of two ferroelectric states in which there is a spontaneous polarization. Thus, under the claimed condition of an "absence of an externally applied voltage" the device appears to have no spontaneous polarization; but when a triangle wave voltage is applied, it may nevertheless display a peak-shaped current response (assuming a large enough voltage is applied), as the applicant asserts was demonstrated in the first experiment described in the declaration. Due to this inconsistency, it is not clear whether *Tanaka* is within the scope of the claim or not.

Another way of looking at this difficulty is that the test referred to in the applicant's test does not appear to be well-defined. If a smaller voltage (below *Tanaka's* saturated voltage level) had been applied in the first experiment, is it possible that the liquid crystal would have remained in the anti-ferroelectric state and therefore not display a peak-shaped current response? And, regardless of the magnitude of the spontaneous polarization, surely it would be possible to apply so small a voltage that there would be no detectable response, given the limits of the measuring apparatus? And, does the scope of the claim depend on the available measurement apparatus for detecting the peak-shaped current response? If the test is not well-defined, it means the scope of the claim is not well-defined.

Claims 2-7, 32, and 33 depend from claim 1.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by *Baur et al.*, U.S. Patent No. 5,841,498.

Baur discloses [see Figs. 1 and 2, for instance] an LCD comprising at least a pair of substrates and a liquid crystal between them; wherein the molecular initial alignment in the liquid crystal material has a parallel or almost parallel direction with respect to the

alignment treatment direction [see orientation layer 5, direction 23] for the liquid crystal material; and the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of substrates under the absence of an externally applied voltage [col. 4, lines 42-43, for instance]. Claim 1 is therefore unpatentable.

8. Claims 1-6, 32, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by *Takatori et al.*, U.S. Patent No. 6,040,889.

Takatori discloses [see Fig. 5], a liquid crystal display device comprising at least a pair of substrate [1, 2], and a liquid crystal material disposed between the substrates, wherein the molecular initial alignment [conducted by rubbing shown in Fig. 15A] in the liquid crystal material has a parallel or almost parallel direction with respect to the alignment treatment direction for the liquid crystal material, and the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of substrates under the absence of an externally applied voltage [col. 4, lines 36-46]. Claims 1 and 3 are therefore anticipated.

Takatori also discloses [col. 9, lines 42-44, Fig. 12] that an antiferroelectric liquid crystal exhibiting a phase transition behavior and having a SmC_A^* phase (ferroelectric property) was injected in the liquid crystal cell, so claim 2 is also anticipated. *Takatori* also discloses that the liquid molecular alignment treatment for the liquid crystal material is conducted in conjunction with a liquid crystal molecular alignment material providing a low surface pre-tilt angle of less than 1.5 degrees [col. 9, lines 14-29], so claims 4 and 5 are also anticipated. It is clear from Fig. 5 of *Takatori* that the liquid crystal material shows a bookshelf structure or quasi-bookshelf structure at the ferroelectric liquid

crystal phase (SmC_A^*), so claim 6 is also anticipated. *Takatori* also discloses [see Fig. 15A] an extinction angle under the absence of an externally applied voltage, when the liquid crystal device is inserted between a polarizer and an analyzer which are arranged in a cross-Nicol relationship, so claim 32 is also anticipated. Considering claim 33, the recited limitation is merely an experimental result of the lack of spontaneous polarization [see pp. 23-24 of the specification]; since *Takatori* has no spontaneous polarization, it will inherently satisfy the limitation that a current passing through the pair of substrates shows substantially no peak-shaped current, when a continuously and linearly changing voltage wave form is applied, so claim 33 is also anticipated.

9. Claims 1-3, 32, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by *Tanaka et al.*, U.S. Patent No. 5,847,799.

Tanaka discloses [see Figs. 1-6], a liquid crystal display device comprising at least a pair of substrate [11, 12], and a liquid crystal material [21] disposed between the substrates, wherein the molecular initial alignment [conducted by rubbing, col. 10, lines 14-20] in the liquid crystal material has a parallel or almost parallel direction with respect to the alignment treatment direction for the liquid crystal material [col. 4, lines 39-45], and the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of substrates under the absence of an externally applied voltage [col. 12, lines 36-67]. Claims 1 and 3 are therefore anticipated.

Tanaka also discloses [col. 10, lines 31-34] that the liquid crystal material can show a ferroelectric property, so claim 2 is also anticipated. *Tanaka* also discloses [see Fig.3 and the corresponding text] an extinction angle under the absence of an externally

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applied voltage, when the liquid crystal device is inserted between a polarizer and an analyzer which are arranged in a cross-Nicol relationship, so claim 32 is also anticipated. Considering claim 33, the recited limitation is merely an experimental result of the lack of spontaneous polarization [see pp. 23-24 of the specification]; since *Tanaka* has no spontaneous polarization, it will inherently satisfy the limitation that a current passing through the pair of substrates shows substantially no peak-shaped current, when a continuously and linearly changing voltage wave form is applied, so claim 33 is also anticipated.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 3-5, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Baur et al.*, U.S. Patent No. 5,841,498 as applied above, in view of official notice.

Baur does not explicitly disclose buffing. The examiner takes official notice that buffing (rubbing) was well-known in the art at the time of the invention. It would have been obvious to one of ordinary skill in the art to use this technique to provide the orientation directions in *Baur*, motivated by it being simple, effective, and well understood. Claim 3 is therefore unpatentable.

The alignment material provides a low surface pre-tilt angle of 1.5° or less [see claim 9 of *Baur*], so claims 4 and 5 are also unpatentable. The device would show an extinction angle as recited in claim 32, and substantially no peak-shaped current as recited in claim 33, so claims 32 and 33 are also unpatentable.

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Takatori et al.*, U.S. Patent No. 6,040,889 in view of *Kitayama et al.*, U.S. Patent No. 5,583,682.

Takatori differs from the claimed invention because it does not explicitly disclose that the helical pitch at the ferroelectric liquid crystal phase is 1.2 times or larger than the panel gap of the liquid crystal device.

Kitayama discloses an LC device where the helical pitch at the ferroelectric LC phase is 1.2 times or larger than the panel gap [col. 4, lines 23-26]. It would have been obvious to one of ordinary skill in the art at the time of the invention to set the helical pitch at the ferroelectric LC phase at 1.2 times or larger than the panel gap since one would be motivated to keep the LC at low temperature [col. 3, line 25] by compensating distortion or deformation due to shrinkage during structural changes [col. 4, lines 1-7] in order to minimize deterioration in display characteristics and problems with low temperature storage [col. 3, lines 25, 48-51]. Ultimately, this serves to provide an LC device with improved gradation display characteristics [col. 2, lines 8-10]. Therefore, claim 7 is unpatentable as well.

13. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.*, U.S. Patent No. 5,847,799 in view of *Kitayama et al.*, U.S. Patent No. 5,583,682.

Tanaka differs from the claimed invention because it does not explicitly disclose that the liquid crystal material shows a bookshelf or quasi-bookshelf structure and that the helical pitch at the ferroelectric liquid crystal phase is 1.2 times or larger than the panel gap of the liquid crystal device.

Kitayama discloses an LC device wherein the LC material shows a bookshelf or quasi-bookshelf layer structure and where the helical pitch at the ferroelectric LC phase is 1.2 times or larger than the panel gap [col. 4, lines 23-26]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a bookshelf or quasi-bookshelf structure and to set the helical pitch at the ferroelectric LC phase at 1.2 times or larger than the panel gap since one would be motivated to keep the LC at low temperature [col. 3, line 25] by compensating distortion or deformation due to shrinkage during structural changes [col. 4, lines 1-7] in order to minimize deterioration in display characteristics and problems with low temperature storage [col. 3, lines 25, 48-51]. Ultimately, this serves to provide an LC device with improved gradation display characteristics [col. 2, lines 8-10]. Therefore, claims 6 and 7 are unpatentable as well.

14. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.*, U.S. Patent No. 5,847,799 in view of *Takatori et al.*, U.S. Patent No. 6,040,889.

Tanaka differs from the claimed invention because it does not explicitly disclose that the liquid crystal molecules provide a surface pre-tilt angle of 1.5 degrees or less.

Takatori discloses a liquid crystal display device wherein the liquid crystal molecules provide a surface pre-tilt angle of 1.5 degrees or less [col. 9, lines 14-29]. It

would have been obvious to one of ordinary skill in the art at the time of the invention to have a surface pretilt of 1.5 degrees or less to obtain a display device that enables continuous gray-scale display, facilitates orientation of liquid crystal, and moreover, provides a wide viewing angle [col. 3, lines 30-34]. Claims 4 and 5 are therefore unpatentable.

Election/Restrictions

15. Claims 8-29 and 31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 30 June 2005.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Schechter/
Primary Examiner, Art Unit 2871
Technology Center 2800
3 July 2008